Residential Heating Oil Tanks

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Preview of Topics

- General topics
  - ✓ What is a heating oil tank?
  - ✓ What will the DEQ and prospective buyer require in assessing an operating heating oil tank?
  - ✓ What will the DEQ and prospective buyer require is assessing an abandoned heating oil tank?
- How is a heating oil tank decommissioned and what does it cost?
  - ✓ By removal
  - ✓ In-place
- How do you assess the environmental liability associated with a release from a heating oil tank?
- If there has been a release, what are the cleanup options and how much will it cost?
  - ✓ Soil matrix cleanup option
  - ✓ Generic remedy cleanup option
  - ✓ Risk-based assessment cleanup option

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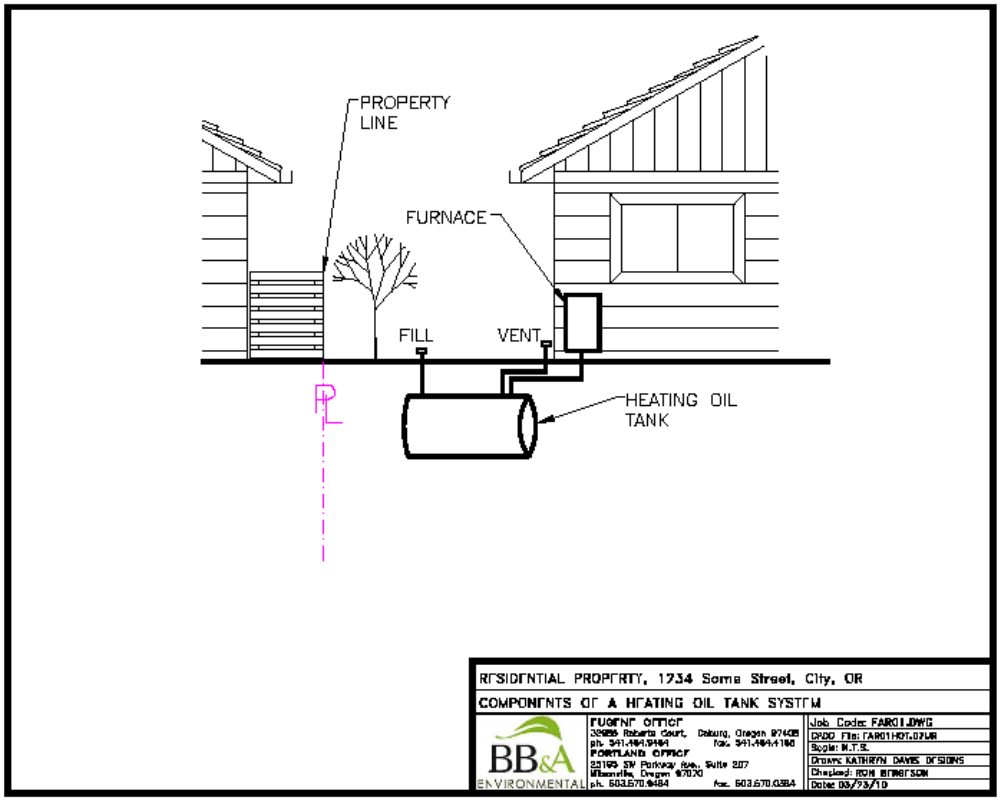
What is a heating oil tank as defined by the DEQ?

An underground storage tank used for the storage of heating oil (diesel fuel) for on-site use

What are the components of a heating oil tank system?

- Tank
- Fill pipe
- Vent pipe
- Fuel supply line
- Furnace



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What will the DEQ and a prospective buyer require in assessing an operating heating oil tank in conjunction with the sale of residential real estate?

- DEQ
  - ✓ Nothing if there is no evidence of a release
- Buyer
  - ✓ How old is the tank? What may be the potential of tank failure and a release?
  - ✓ Has there been a release from the tank?

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How do you determine if there has been a release from an operating heating oil tank?

- Installation of soil probes to allow collection of soil samples
- Submit soil samples for laboratory analysis

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What will the DEQ and a prospective buyer require in assessing an abandoned heating oil tank in conjunction with the sale of residential real estate?

- DEQ
  - ✓ Oregon law requires the owner to pump out all heating oil from an abandoned (unused) underground heating oil tank when:
    - The tank is no longer used as a heating source
    - The tank has been replaced with a new tank
    - The home or business is sold
  - ✓ Retain documentation (e.g., dated receipts) that the tank was emptied and residual fuel recycled or disposed of in an authorized manner; provide documentation to prospective buyers
  - ✓ Leave the vent line in place unless the tank is decommissioned
  - ✓ Actual decommissioning by removal or in-place is voluntary
  - ✓ DEQ has adopted standards for heating oil tank decommissioning
- Buyer
  - ✓ Sample to verify there has not been a release from the tank.
  - ✓ Decommission the tank by removal or in-place and sample to verify there has not been a release.

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How can I determine if there is an abandoned heating oil tank on a property? Why are heating oil tanks abandoned?

What to look for:

- Look for the fill pipe
- Look for the vent pipe
- Trace supply piping from the furnace through the foundation
- Assess whether homes in the area have or had heating oil tanks

Why abandoned:

- Furnace malfunctions
- Water present in the fuel
- Tank failure (holes from corrosion allow groundwater to enter tank)
- Tank replaced with above ground tank
- Home converted to gas or electric heat

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How is a heating oil tank decommissioned by removal?

- Request a utility locate
- Obtain necessary local permits
- Drain and flush fuel piping into the tank
- Excavate and expose the top of the tank
- Remove all liquids from the tank
- Cap and remove fuel piping
- Inert the tank to prevent fire and explosive hazards
- Complete the excavation and remove the tank from the subsurface
- Inspect the tank for any holes or corrosion
- After checking to make sure the tank is still inerted, cut an access hole in the tank
- Removal residual solids and sludges from the tank
- Transport the tank off-site for disposal/recycling in an authorized manner
- Collect soil samples to assess the presence of a release of heating oil from the tank
- Complete site restoration

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Inspect the tank for holes and corrosion

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Inspect the tank for holes and corrosion

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Sample (contaminated) soil beneath the tank

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Complete site restoration

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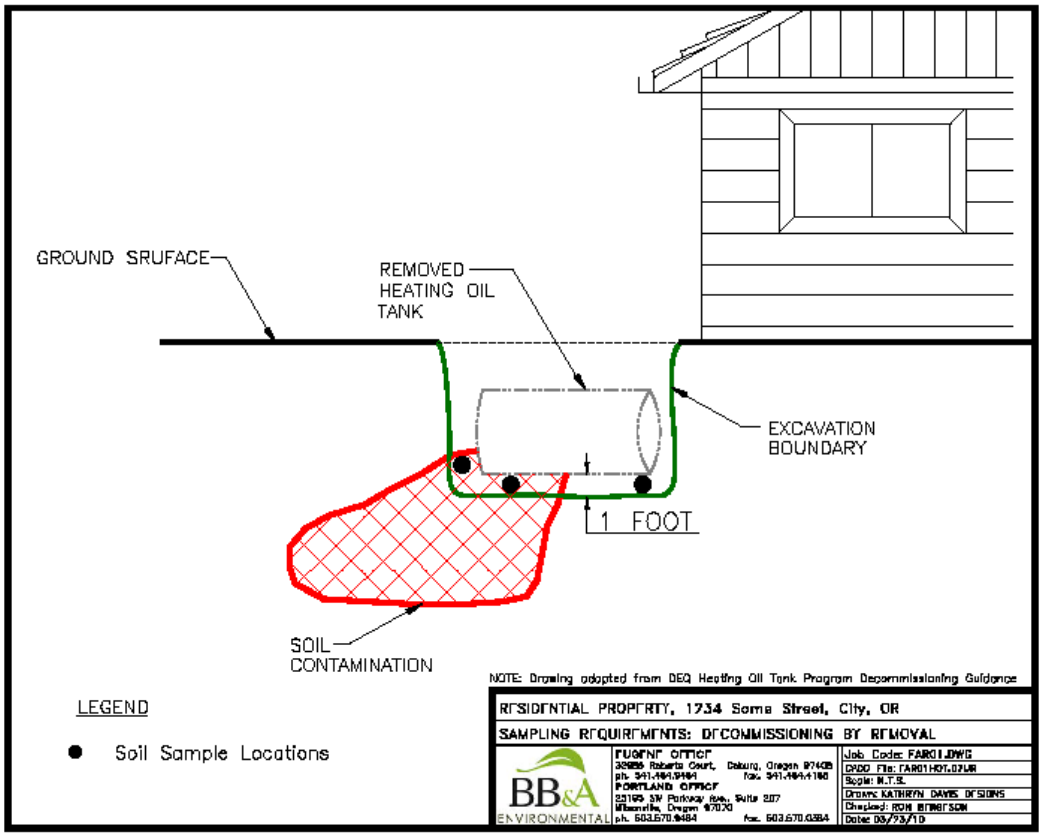
What are the sampling requirements when a tank is decommissioned by removal?

- One (1) sample from the worst contamination present
- Two (2) samples from native soil between six (6) inches and one (1) foot below the bottom of the former heating oil tank
- If groundwater enters the heating oil tank excavation, a groundwater sample must also be collected



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How is a heating oil tank decommissioned in-place?

- Request a utility locate
- Complete soil sampling (alternative option)
- Obtain necessary local permits
- Excavate overburden soil material (e.g., two [2] feet) and expose the top of the tank
- Empty the tank of all fluids (i.e., heating oil and water)
- Properly inert the tank to prevent any safety or fire hazards
- Cut a hole in the top of the tank large enough to safely enter the tank
- Clean the tank surfaces of residual heating oil and sludges
- Inspect the tank surfaces for corrosion and holes
- Complete sampling activities through the bottom of both ends of the tank (preferred option)
- Fill the tank with an inert material (e.g., sand, pea gravel, concrete slurry mix)
- Replace clean overburden soil material
- Complete site restoration

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Sample to assess if a release has occurred

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Visually inspect soil samples

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Excavate and expose the top of the tank

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Exposed fill and vent pipes

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Remove residual heating oil and sludges

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Fill the tank with an inert material

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Fill the tank with an inert material

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Placement of inert concrete slurry mix

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Concrete slurry above the top of the tank

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Complete site restoration

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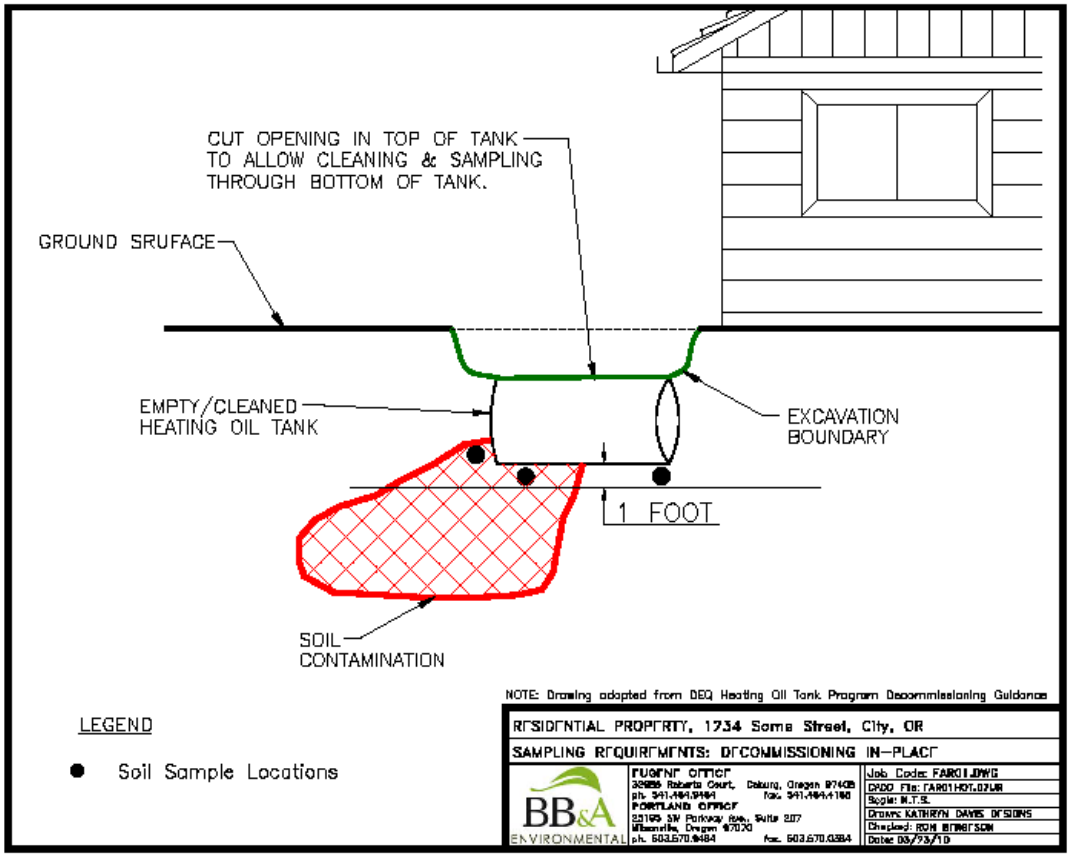
What are the sampling requirements when a tank is decommissioned in-place?

- Preferred Method:
  - ✓ One (1) sample from the worst contamination present
  - ✓ Two (2) samples from native soil between six (6) inches and one (1) foot below the bottom of the heating oil tank obtained by cutting holes in the bottom of the tank
  - ✓ If groundwater is encountered in the sampling locations, a groundwater sample must also be collected



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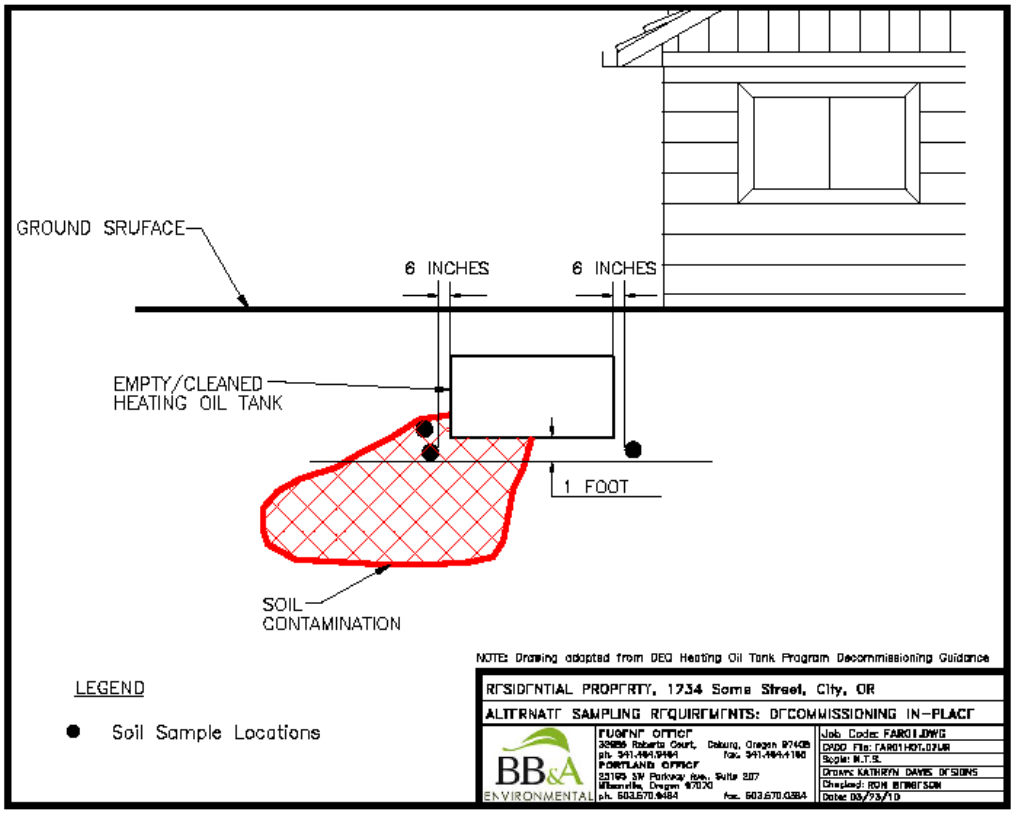
What are the sampling requirements when a tank is decommissioned in-place (cont.)?

- Alternative Method:
  - ✓ One (1) sample from the worst contamination present
  - ✓ Two (2) samples from native soil between one (1) and two (2) feet below the bottom of the heating oil tank and within six (6) inches from each end of the tank
  - ✓ If groundwater is encountered in the sampling locations, a groundwater sample must also be collected



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Why decommission a tank in-place since the cost is approximately the same as decommissioning by removal?

- When removing the tank would jeopardize the structural integrity of a building or foundation
- When the tank is inaccessible (e.g., beneath a foundation footing or beneath a deck)

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What is required to decommission a heating oil tank in accordance with adopted DEQ standards?

- Collect soil samples to confirm that:
  - ✓ A release of heating oil from the tank has not occurred
  - ✓ Or if there has been a release, to document residual contaminant concentrations are at or below applicable cleanup standards for the site
- Have the decommissioning project certified by a DEQ licensed Heating Oil Service Provider (DEQ does allow homeowner to decommission their own tanks but is not recommended)
- Submit the certified report and documentation to the DEQ with appropriate filling fees (i.e., a $50 fee when no contamination detected [voluntary] or $125 fee when contamination is detected)

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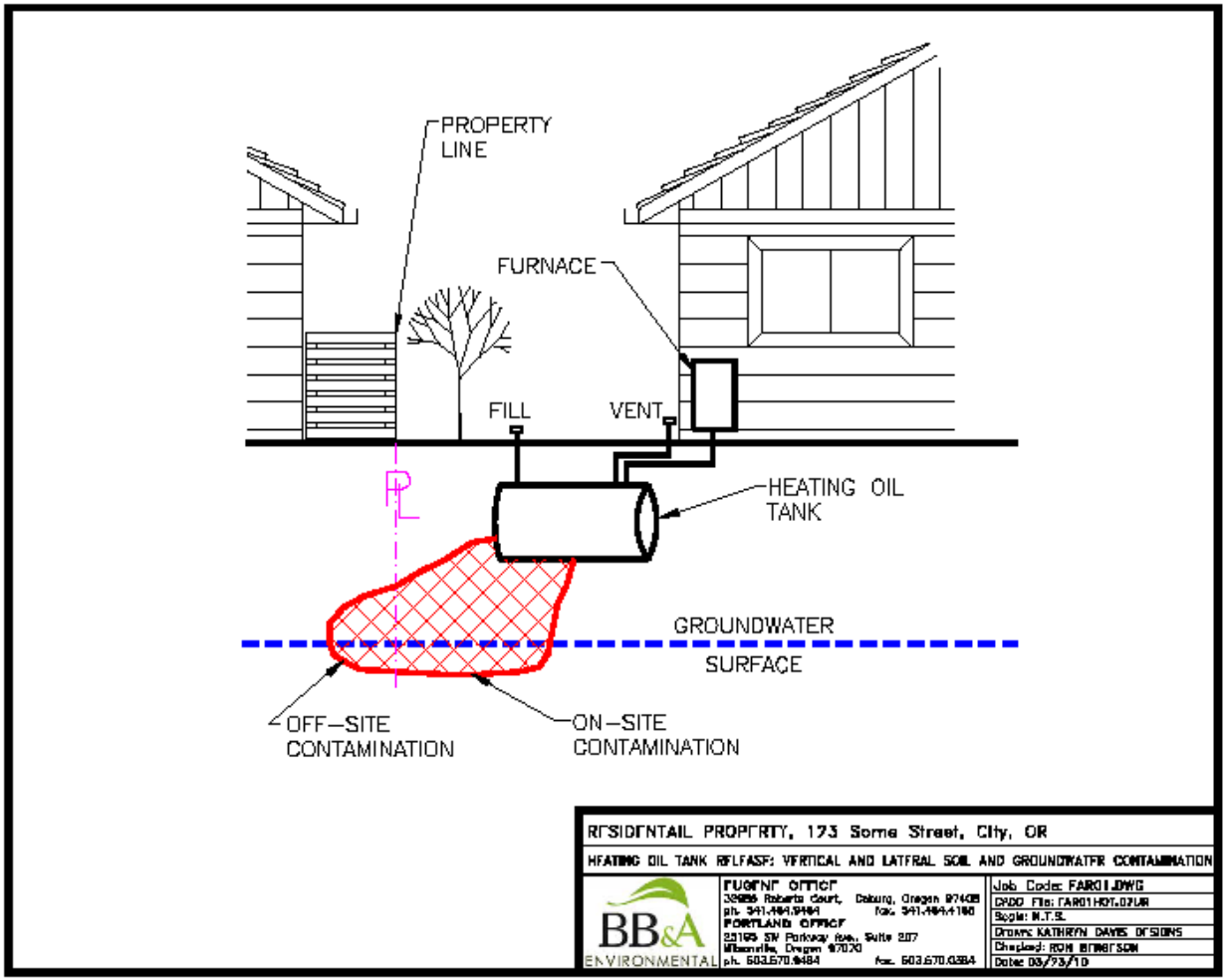
What does a release from a heating oil tank look like?



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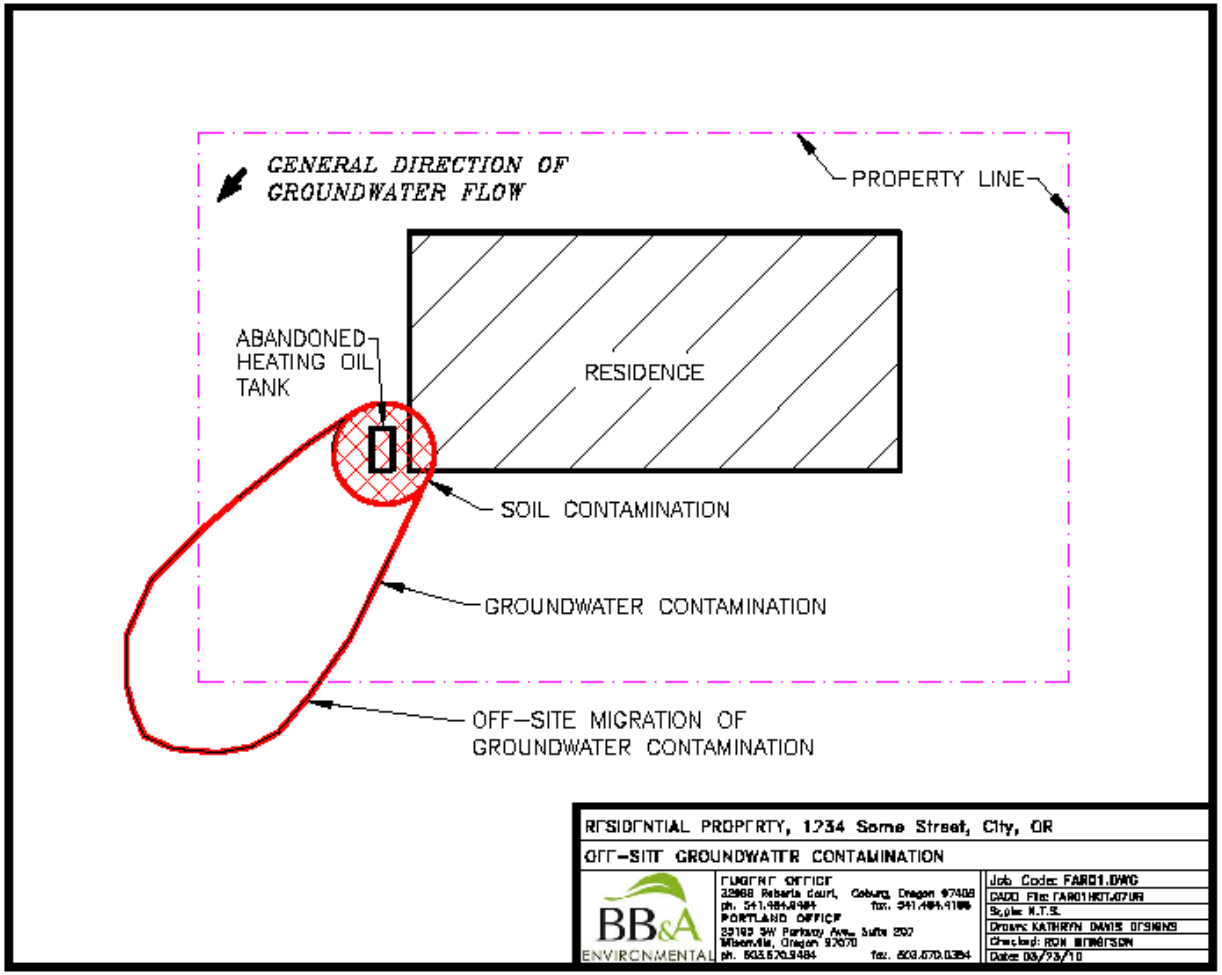
How does contamination migrate off site?



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If there is a confirmed release from an operating or abandoned heating oil tank, what does the DEQ require?

- The release must be reported to the DEQ within 72 hours
- The release must be investigated and cleaned up in accordance with one (1) of three (3) cleanup options
  - ✓ Cleanup to soil matrix standards
  - ✓ Cleanup to generic remedy standards
  - ✓ Cleanup to risk-based standards

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What are the requirements of the soil matrix cleanup option?

- Soil matrix cleanup option utilizes the most conservative cleanup standards
- There are three (3) cleanup levels based upon an evaluation of five (5) site criteria, including:
  - ✓ Depth to groundwater
  - ✓ Mean annual precipitation
  - ✓ Native soil type
  - ✓ Sensitivity of the uppermost aquifer
  - ✓ Potential receptors
- There are three (3) cleanup levels for heating oil release sites:
  - ✓ Level 1 – 100 ppm
  - ✓ Level 2 – 500 ppm
  - ✓ Level 3 – 1,000 ppm

MATRIX SCORE SHEET

1. Depth to Groundwater		
< 25 feet	(10)	
25 - 50 feet	(7)	
51 - 100 feet	(4)	
> 100 feet	(1)	
2. Mean Annual Precipitation		
> 45 inches	(10)	
20 - 45 inches	(5)	
< 20 inches	(1)	
3. Native Soil Type		
Course sands, gravels	(10)	
Silts, fine sands	(5)	
Clays	(1)	
4. Sensitivity of Uppermost Aquifer		
Sole Source	(10)	
Current Potable	(7)	
Future Potable	(4)	
Non-potable	(1)	
5. Potential Receptors		
Many, near	(10)	
Medium	(5)	
Few, far	(1)	
TOTAL SCORE	=	

MATRIX SCORE	Cleanup Level (ppm TPH)	
	Gasoline	Diesel
Level 1: > 40 pts.	40	100
Level 2: 25 - 40 pts.	80	500
Level 3: < 25 pts.	130	1000

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What are the requirements of the generic remedy cleanup option?

- There are five (5) qualifying criteria that the site must meet, including:
  - ✓ The release must be from and underground heating oil tank
  - ✓ The only product released is heating oil or diesel #2
  - ✓ Contamination is limited to soil only with no groundwater encountered in the tank excavation or in any sampling locations (e.g., probe or boring locations)
  - ✓ There is no free product (i.e., liquid) as a result of the release
  - ✓ There are no ecological risks posed by the release
- If the site meets the qualifying criteria, soil sample analysis must demonstrate the following:
  - ✓ Total petroleum hydrocarbon (TPH) concentration must be below 10,000 ppm
  - ✓ Benzene in soil contamination above 2,500 ppm must not exceed 0.1 ppm or 100 ppb
  - ✓ Define the amount of soil contamination in cubic yards above 500 ppm; the total soil contamination must not exceed 65 cubic yards
  - ✓ Demonstrate that there is no contamination within three (3) feet of the ground surface
  - ✓ Demonstrate that soil contamination is above the seasonal high water table
  - ✓ Demonstrate that surface waters (e.g., creeks, rivers, lakes) are more than 100 feet away

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What are the requirements of the risk-based cleanup option?

- Determination of risk
  - ✓ Risk = Toxicity x Exposure
  - ✓ The risk-based cleanup option evaluates 16 individual chemical compounds including the volatile aromatic hydrocarbons benzene, toluene, ethylbenzene, xylenes (BTEX) and 12 polynuclear aromatic hydrocarbons (PAHs)
- Completion of a conceptual site model
  - ✓ Contaminant Sources → Exposure Pathways → Receptor Scenarios
- Determination of applicable exposure pathways
  - ✓ Inhalation
  - ✓ Ingestion
  - ✓ Dermal contact
- Determination of applicable receptor scenarios
  - ✓ Adults and children in a residential scenario
  - ✓ Adults in an occupational scenario
  - ✓ Adults in a construction/excavation worker scenario
- Consideration of engineering (e.g., installation of vapor barrier) and institutional controls (e.g., deed restriction prohibiting beneficial use of groundwater) to manage risk

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What is a part per billion (ppb)?

- Trace Concentration Units

Unit	1 Part Per Billion (ppb)
Length	1 inch/16,000 miles
Time	1 second/32 years
Money	1 cent/10,000,000 dollars
Area	1 square foot/36 square miles
Action	1 bogey/3,500,000 golf tournaments

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- Cleanup Standards for Common Contaminants

  Cleanup standard using the residential receptor scenario and groundwater ingestion exposure pathway (most stringent) for benzene is 0.35 ppb.

  Cleanup standard using the residential receptor scenario and vapor intrusion into buildings from contaminated soil for benzene is 68 ppb.

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What are the advantages and disadvantages of the three (3) cleanup options?

- Soil Matrix Cleanup Option
  - ✓ Almost always involves excavation and off-site disposal of contaminated soil
  - ✓ When contaminated soil removal and disposal is required, the soil matrix cleanup option usually results in the highest cost
  - ✓ Sampling and laboratory analysis costs typically are lower than other cleanup options
- Generic Remedy Cleanup Option
  - ✓ Costs are typically lower than the soil matrix cleanup option since removal of contaminated soil is usually not required
  - ✓ Sampling and laboratory costs are typically higher because more samples are required to define the lateral and vertical extent of soil contamination
- Risk-Based Cleanup Option
  - ✓ Costs are typically lower than the soil matrix cleanup option since removal of contaminated soil is usually not required
  - ✓ Sampling and laboratory costs are typically higher because more samples are required to define the lateral and vertical extent of soil and groundwater contamination and analysis must include all applicable chemical compounds
  - ✓ Regulatory reporting costs are typically higher

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For More Information or Site Specific Work Plan and Cost Proposal Contact

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